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In examining the positions of the movable contacts shown for coupling machine No. 2 for tension or quantity, it will be seen that the direction of the currents is similar.

Fig. 12 gives a perspective view of this commutator. The contacts are covered with an ebonite plate, through which passes the handle for manipulating the movable plate. This ebonite plate bears four inscriptions, corresponding to the different combinations of the commutator; and an index moving with the handle indicates the combination in use.

This system has the advantage of changing instantly the grouping of the two circuits of the same machine, and of quickly substituting one machine for the other. It has, however, the drawback, common to all turning-contacts, of not being absolutely reliable.

### THE HEAD-HUNTERS OF BORNEO.

In an octavo volume of three hundred and thirty-seven pages, Carl Bock describes his journeyings into the interior and across the island of Borneo and in the island of Sumatra. The trip across Borneo, of which the book mainly treats, was undertaken at the instance of the governor of the Dutch Indies, for the purpose of making a report upon the native races of the interior, and of gathering collections of the fauna.

The author describes well; and those who read for amusement and general information will not only find the book entertaining, but will derive an excellent idea of the chief features of Bornean scenery, of its strange animal life, of the character and peculiarities of the natives, and of many curious phases of human life under the exceptional conditions of this tropical island. Scattered through the first fifteen chapters, or what may be fitly termed the diary of the trip, are very many interesting facts and observations of value to the anthropologist. But the subsequent chapters more particularly interest him, being devoted to a consideration of the province of Koetoei, and of the Dyak tribes inhabiting it. The second part treats of a limited sojourn in Sumatra, and is by far the less important, as it is the smaller portion of the volume.

Borneo is stated to be inhabited by Malays, Boegis, a couple of hundred Chinamen, and a few Klings, and by Dyaks. The Malays are chiefly confined to the coast. The Boegis, emigrants from the south part of the Celebes, are settled in one district (Koetoei), 'where they are getting numerous and powerful.' The Dyaks, who are split up into numerous independent and hostile tribes, occupy the interior of the island.

Perhaps the most important contribution to anthropologic knowledge made by Mr. Bock, is his account of the Orang Poonans, or forest people, whom he believes to be the aboriginal inhabitants of Borneo, and who are not only distinct from the neighboring Dyaks, but, in their intercourse with them, do not appear to have adopted their habits. Meeting some of the Poonan men at Long Wai, a Dyak village, he succeeded in inducing one of the chiefs to escort him to his forest home, where, however, his observations were limited to a single afternoon. According to the picture presented by the author, the Poonans would seem to be in the lowest stage of savagery. He found them almost destitute of clothing, without pottery,

with few utensils (and of the simplest kind); and he confirms the belief, current in the island, that they build no dwellings properly so called, but live day and night in the open air, with no better shelter in showery weather than that afforded by an attap mat. It is possible that a longer and more intimate acquaintance with this wild people would have led to the discovery of tokens of a higher culture. The skin of the Poonans, particularly of the women, now seen by a European for the first time, is 'somewhat fairer than that of the other Dyaks,'—a result, as the author doubtless correctly surmises, of their residing in the dark forest.

A curious industry of the people is the collection of bezoar stones, which are used by the Chinese as a cure-all. The bezoar stones are of two kinds: one is derived from an external wound on a porcupine, and is supposed by the author to be composed of bits of leaves, etc., formed into a ball by the congealed blood; the other is said to be a gall-stone, found in different parts of the boehis monkey, *Semnopithecus cristatus*.

Head-hunting, as practised by all the Dyak tribes, is asserted to be, on what appears to be sufficient evidence, part and parcel of their religious rites. Birth and namings, marriages and burials, not to mention less important events, cannot be properly celebrated, unless the heads of a few enemies, more or less, have been secured to grace the festivities or solemnities. "Head-hunting," says the author, "is the keystone, so to speak, in the edifice of Dyak religion and character. Its perpetual practice is, no doubt, one great cause of the rapid extinction of the race."

Naturally enough, a practice so deep-rooted as this, has proved, and must continue to prove, the one great obstacle to be overcome in attempts to civilize the Dyaks.

While all the Dyaks are head-hunters, only one of the tribes, the Bahou tribe, practises cannibalism. Human flesh is eaten mainly at the feasts that follow a successful head-hunting expedition. The form of anthropophagy here disclosed seems to be somewhat analogous to that which obtained among the North-American Indians, not a few tribes of whom partook of the flesh of enemies, especially when the individuals slain were greatly renowned. At the same time, it is stated that these cannibal feasts are also given in celebration of various events, such as on the occasion of the death of a chief. Moreover, not only are the prisoners of war sacrificed, "but the richer members of the community give a number of slave-debtors (i.e., those who are sold into slavery to work out debts) to be put to death by slow torture, and eaten."

'Pomali' is a practice in vogue among the Dyaks, and also among other natives of the Malay archipelago, which seems to be somewhat allied in its nature to the tabu of the South-Sea Islander; although it appears to be less complex in its workings, and to cover much less ground, than that curious custom. As a sign that pomali is being resorted to, a bunch of maize is stuck in the ground, or baskets of rice are suspended from a bamboo post, when strangers are prohibited from entering the house or field thus pomalied.

Tattooing was found to be a common practice among the Dyaks, the women being the more elaborately ornamented. The method adopted by the professional tattooer is to first cut outlines of the intended pattern in wood, and then trace them on the body, when it is pricked in with a sharp-pointed piece of bamboo or a needle, dipped into a pigment prepared from vegetable dyes. Men are tattooed when they attain manhood, and women when about to be mar-

ried; tattooing being, with the female sex, one of the privileges of matrimony.

No communal practices appear to have attracted the author's attention; but the statement made, that among the Sandjoeng Dyaks there are only "a couple of houses in each village, but so large as to contain between them the whole population of 400 or 500," is of interest, since it carries with it the implication of some form of communal life. In another place these communal dwellings are described as from eighty to a hundred and sixty feet in length, twenty to thirty feet in width, and with walls about ten feet high, the ridge of the roof rising another five or six feet.

The house proper has but one floor, raised on posts of ironwood about fifteen or twenty feet from the ground, which forms the actual residence, under which is a second floor, from four to six feet from the ground, which serves for many domestic purposes, to hold councils in, and as a playground for the children.

The fact, that, "whenever a deer is killed, every inhabitant of the village receives a share," the one actually shooting the animal having the right to the horns, also clearly points to the existence of well-defined hunting-laws rooted in communal principles.

Judging from the description given, the Dyaks would seem to possess many savage virtues. They were found by the author to be singularly temperate both in eating and drinking. The only native intoxicant is 'toewak,' — a drink made from wild honey. When offered brandy, they refused it, exhibiting a strong distaste even to its odor; nor could they be induced to more than taste it. They indulge to excess, however, in betel-chewing, — a habit for which they are indebted to the Malays.

In mental capacity the Dyaks are stated to be on an equality with the Malays; but they are more energetic, and more willing to work. The author attests their truthfulness, and states that thefts and robberies are entirely unknown among them. On the other hand, they were found to be most importunate beggars.

The chief industrial occupation of the Dyaks is stated to be agriculture, both sexes taking part in the labors of the field. As usual, the heavier portion falls to the lot of the women, who are said to be 'the only beasts of burden.' Rice is the main crop; but bananas, sugar-cane, and a few cocoanuts are also raised. The production, however, only suffices for immediate wants, and in times of drought great distress always ensues.

The cutting of rattan to supply the Malay trade is the next most important occupation. Considerable quantities of gutta-percha are also collected, but in so wasteful a manner, as, in the author's opinion, to threaten the future supply.

The gathering of wax from the nests of the indigenous bees is also an important industry; and twice a year the edible nests of the swallow (*Hirundo esculenta*) are collected for sale to the Chinese.

The medical practices of the Dyaks appear to be strictly analogous to those of other savages. Certain plants are employed as remedies; the task of concocting the medicine, and administering it, devolving mainly, as appeared to the author, upon the women, who also do what nursing is required. The main reliance, however, for the cure of disease, is in charms and sorcery.

Curiously enough, symptoms of the prevalent Darwinian theory seem to have penetrated these far-off regions; and, while visiting a village of Dyak in the interior, the author found a strong belief in the ex-

istence of people with tails in a country but a few days distant. To use his own words, "such definite statements were made to me on the subject, that I could hardly resist the temptation to penetrate myself into the stronghold of my ancestral representatives." He contented himself, however, with hiring one of the natives to go in his stead, with, needless to say, quite unsatisfactory results.

In appendices are given lists of land and freshwater shells collected by the author in Borneo and Sumatra, with descriptions of new species; a list of birds collected on the west coast of Sumatra; a list of Sumatra butterflies; and a short vocabulary of the Long Wai (Dyak) dialect.

The volume is copiously illustrated with lithographic plates from the author's original drawings. These, if not remarkable for artistic excellence, yet serve well the purpose for which intended.

### GEOLOGICAL MAP OF BELGIUM.

THE appearance of the first sheet of the new *Carte géologique de la Belgique, dressée par ordre du gouvernement* introduces to us a new system of geological cartography, which in many respects is more perfect than any thing yet attempted by a geological survey. The system adopted shows truly the real geology of the country, but gives an imperfect idea of the general distribution of the strata. This, however, can be readily shown on maps of a much smaller scale. The sheet which has just appeared is that of Cinney: it is on the scale of 1 : 20,000, the topography being indicated by 10-metre contour lines. The outcrops are drawn as they are found, and colored with even tints. The theoretical limits of the strata are defined by degraded tints of the same color as that used to designate the outcrops of the same formation. If two outcrops are visible (as with the carboniferous limestone, which is locally covered with sands), the diagrammatical extension of these is represented by fine dots of the color of the sands. The light colors in even tints are, on the contrary, reserved to represent the general disposition of the superficial quaternary and modern deposits. These have been studied carefully, especially with the help of borings; and the lettering on the map indicates the exact spot of each sounding. A short, straight, black line is used to represent the strike of the beds; and a small point, like an arrow-head, projecting from it, indicates the direction of the dip, while a number engraved on the other side of the line shows its angle. Forests where no outcrops are visible are left uncolored. Where the superficial deposits consist of the detritus of a known formation, the fact is indicated by equidistant broken lines of the same color as that used to designate the outcrop of which they are the waste.

Owing to the largeness of the scale, and the accurate topography of the maps of the war department, the geologists of Belgium have been enabled to make a true representation of the geology of Belgium as shown by the outcrops of rocks that are visible, and the superficial and surface deposits; placing on the map merely what is known and can be seen, without leaving any room for theoretical views of extension of formations to creep in and create errors, as they nearly always do. When the map is completed, it will consist of 430 sheets; besides which, there will be published a number of atlas-sheets of sections on a scale of 1 : 5,000. Accompanying each sheet of the map, an explanatory text will be published, containing a plate on which will be drawn three diagram-